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US005889386A

United States Patent [19][11] **Patent Number:** **5,889,386****Koenck**[45] **Date of Patent:** **Mar. 30, 1999**

[54] **BATTERY CONDITIONING SYSTEM
HAVING COMMUNICATION WITH
BATTERY PARAMETER MEMORY MEANS
IN CONJUNCTION WITH BATTERY
CONDITIONING**

[75] **Inventor:** Steven E. Koenck, Cedar Rapids, Iowa

[73] **Assignee:** Intermec Technology Corporation,
Everett, Wash.

[21] **Appl. No.:** 82,061

[22] **Filed:** May 20, 1998

Related U.S. Application Data

[63] ~~Continuation of Ser. No. 879,475, Jun. 20, 1997~~ which is a continuation of Ser. No. 561,665, Nov. 22, 1995, abandoned, which is a continuation of Ser. No. 134,881, Oct. 12, 1993, Pat. No. 5,508,599, which is a continuation of Ser. No. 769,337, Oct. 1, 1991, Pat. No. 5,278,487, which is a continuation of Ser. No. 544,230, Jun. 19, 1990, abandoned, which is a division of Ser. No. 422,226, Oct. 16, 1989, Pat. No. 4,961,043, which is a division of Ser. No. 168,352, Mar. 15, 1988, Pat. No. 4,885,523, which is a continuation-in-part of Ser. No. 944,503, Dec. 18, 1986, Pat. No. 4,737,702, which is a continuation-in-part of Ser. No. 876,194, Jun. 19, 1986, Pat. No. 4,709,202, which is a division of Ser. No. 797,235, Nov. 12, 1985, Pat. No. 4,716,354, which is a continuation-in-part of Ser. No. 612,588, May 21, 1984, Pat. No. 4,553,081, which is a continuation-in-part of Ser. No. 385,830, Jun. 7, 1982, Pat. No. 4,455,523.

[51] **Int. Cl.⁶** H02J 7/00
[52] **U.S. Cl.** 320/136; 320/107; 320/112;
320/114; 320/134; 320/427; 320/426
[58] **Field of Search** 320/107, 106,
320/112, 113, 114, 115, 116, 134, 136;
324/426-435

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[57] ABSTRACT

In an exemplary embodiment, a battery conditioning system monitors battery conditioning and includes a memory for storing data based thereon; for example, data may be stored representative of available battery capacity as measured during a deep discharge cycle. With a microprocessor monitoring battery operation of a portable unit, a measure of remaining battery capacity can be calculated and displayed. Where the microprocessor and battery conditioning system memory are permanently secured to the battery so as to receive operating power therefrom during storage and handling, the performance of a given battery in actual use can be accurately judged since the battery system can itself maintain a count of accumulated hours of use and other relevant parameters. In the case of a non-portable conditioning system, two-way communication may be established with a memory associated with the portable unit so that the portable unit can transmit to the conditioning system information concerning battery parameters (e.g. rated battery capacity) and/or battery usage (e.g. numbers of shallow discharge and recharge cycles), and after a conditioning operation, the conditioning system can transmit to the portable unit a measured value of battery capacity, for example.

20 Claims, 24 Drawing Sheets